EUROGRAM
#94-05 (Sep-Oct 94)
EUROPEAN OFFICE OF AEROSPACE RESEARCH AND DEVELOPMENT

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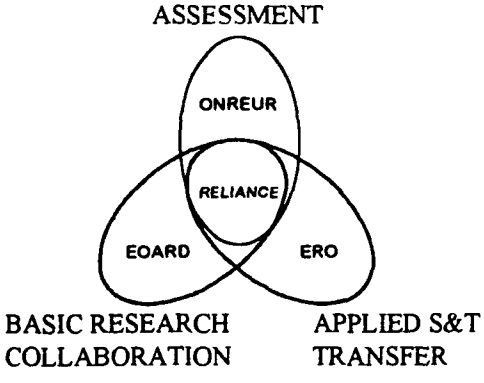
The *EUROGRAM* is published bimonthly by the US Air Force European Office of Aerospace Research and Development (EOARD), Detachment 1 of the Air Force Office of Scientific Research (AFOSR). It contains reports on European research, a complete list of current EOARD points of contact, and a summary of recent work in our primary programs. The purpose of the *EUROGRAM* is twofold: first, to alert the Air Force technical community to research developments in Europe from which a technical dialogue may begin, and second, to provide an executive summary for Air Force management of work discovered by EOARD.

Tri-Service Operations at the Edison House

EOARD has served as the US Air Force liaison with European science since 1952. EOARD's scientific function is paralleled by the Navy's Office of Naval Research-Europe (ONREUR), established in 1946, and the Army's European Research Office (ERO), which came into existence in 1956. All three scientific offices had a similar basic mission--to establish and maintain scientific collaborations between researchers on opposite sides of the Atlantic. Geographic location distinguished each organization in the early years. The Army office was in Frankfurt, Germany, the Air Force office in Brussels, Belgium, and the Navy office in London, UK. Additional missions and roles were also different. For example, through the 1950s and 1960s, the Air Force office (EOAR) had its own aircraft, a VC-47, to transport passengers and scientific equipment. In the early 1970s the three services co-located in the Edison House in London. Joint operations became a way of life.



Edison House maintains an easy alliance between the three services. Many factors contribute to the "reliant" attitude. One of the most basic and important is the day-to-day rubbing of elbows as roommates in our building. We interact formally through tri-service meetings on specific topics (e.g. administration, dealings with the Former Soviet Union and Eastern Europe, and enviromental issues) and informally through conversations and encounters in common areas such as the library, the foyer, or the local gym. Another contribution is due to the similar, but not duplicate, organizational missions. The diagram on the left illustrates the main focus of each office and the overlap of interests.

Most of our programs lend themselves easily to tri-service involvement. Our Window-on-Science program is very similar to ONREUR's Visiting Scientist program and ERO's Liaison Visit program. During FY94, 24 WOS visitors (roughly 14% of the total) went to a combination of Army, Air Force, and Navy sites. The Edison House offices can combine their support for important scientific conferences and workshops (for example, the European Conference on Laser Interaction with Matter to be held in Oxford, UK, from 19-23 September), or, perhaps more significantly, spread scarce resources by agreeing on which offices will contribute to specific conferences. Site visits by a joint Edison House team can be very effective, as in the case of a bi-service visit to the Ukraine, reported in the May-June issue of the *EUROGRAM*. However, by sharing information and by representing the other services, EOARD, ERO, and ONREUR greatly extend their influence and abililty to gather information. Joint contracts and grants are possible and, for expediency, one office may help process the paperwork for another office.

Tri-Service Operations (cont.)

Two other offices round out the Edison House. The Army has a Standardization Group and the Air Force a Research and Development Liaison office to concentrate on US-UK interactions in the formal arena of Memoranda of Understanding (MOU) and Data Exchange Agreements (DEA).

Edison House is a unique hybrid. Offices from three services have worked side-by-side on a wide variety of singular or joint scientific projects for over twenty years. Reliance thrives in daily practice. The *EUROGRAM* will continue to highlight the mutual efforts of the three scientific offices. In the Liaison Officer Reports, joint actions are indentified as "bi-service" or "tri-service". The Window-on-Science and Conference Support tables list in bold print joint contributions and itineraries. Finally, the *EUROGRAM* will periodically print joint items of note and provides points of contact in all Edison House agencies.

Lt Col Don Erbschloe
Chief, International Programs

EOARD Spends $1M on Russian Projects

The Director, Defense Research and Engineering (DDR&E) gave EOARD one million dollars in mid-July to fund small scientific projects in Russia and the Former Soviet Union. A deadline of 15 August to get all the paperwork to the contracting office at RAF Croughton meant concentrating on proposals less than $25K. In a little over three weeks EOARD generated 41 contracts from 40 different researchers at 32 different agencies and laboratories in the Former Soviet Union. This essentially doubled the amount of contracts EOARD had produced through the first ten months of FY94.

EOARD was the logical choice for this assignment. We have a great deal of experience with small grants and contracts are we are centrally located to interact with the Russian scientists and researchers in the Air Force laboratories. In the morning we can work with our Russian contacts before their business day ends. In the afternoon we can get in touch with US contacts when they come into work.

Although we did not have much time, we had a good base from which to start. Liaison officers at EOARD had several Russian proposals in hand, submitted to them either from site visits to Russia or through AF lab contacts. The first filter we applied was to consider only projects which had been reviewed and rated positively by laboratory personnel. We were looking for good science and projects which tied in with laboratory interests. The next step was to rank order these reviewed projects. We did this based on liaison officer input. It was critical that the liaison officers were familiar with their customers and their needs and could prioritize proposals. This stage of the process worked most smoothly when a liaison officer had already coordinated the proposals and their ranking with a single point of contact (typically the Chief Scientist) in laboratory directorates. A parallel "certification" followed the preparation of the first draft of the prioritized list. Dr Helmut Hellwig, Director of AFOSR, reviewed the draft list, made comments, and approved the final version of the list. We also sent letters to the chiefs of the applicable laboratory directorates to ask for their approval of the projects and check whether our order of priority agreed with theirs. In some cases we were able to swap proposals which were deemed more important. The final approved list still had many more projects than we could fund. We went through the list one more time trying to cover as much science and "sharing the wealth" as much as possible. For example we tried not to fund too many similar proposals, or projects from the same group or principal investigators in Russia. We also tried to benefit as many different laboratory directorates as possible. There were obstacles, though. Over half of the proposals we had were for $25K or more. We needed proposals for less than $25K. That meant getting in contact with the principal investigators and getting new proposals faxed to us. In many cases this was nontrivial because the summer vacation period had started in Russia and many laboratories close their doors in late July and early August. As the deadline grew closer, we attempted to stick to the original list of priorities, but in some cases had to substitute projects ranked lower because higher priority projects did not have complete or workable proposals.

The engine behind the efficient processing of contracts is the contracting shop at RAF Croughton, run by Mr Weldon Corley. This small but vigorous office is blessed with a staff of enthusiastic workers full of drive and initiative. Contracting has always had a good working relationship with EOARD. We sent personnel TDY to augment the Croughton office to help with the tidal wave of paperwork.

Several other people were crucial to this project. The AF laboratory contacts were invaluable in helping our staff get in touch with the Russian researchers and suggesting revisions to consolidate or modify proposals. Ms Janet Johnston (PLG) who heads the Edison House Tri-Service group on FSU interactions spearheaded the entire operation. Mr Fred Johnson, from the EOARD administrative staff, maintained the critical database on proposals. The liaison officers at EOARD worked long and hard hours on the phones, computers, and fax machines. Two of them, Maj Dan Stech (WLS) and Ms Vicki Cox (PLP) had recently arrived at EOARD and underwent a baptism by fire! The liaison assistants and administrative staff run by Mr Vince DeKime and MSgt Harold Kaid took on new responsibilities and were invaluable augmentees to the EOARD financial and budget office. Mrs Barbara Murphy, the EOARD budget analyst, and Mr Andy Davison, the budget liaison assistant, streamlined the paperwork trail and processed all the forms.

EOARD spends $1M (cont.)

It is premature to consider the successes and shortcomings of this exercise, but the EOARD staff is compiling a list of what worked and what didn't. Certainly one thing we need in hand is a ready supply of good, complete proposals for less than $25K, prioritized and approved by the laboratories. We cannot print the list of projects we funded because of our policy not to publish that information until the contract has been awarded. Future issues of the *EUROGRAM* will list the awarded projects. You may contact your EOARD laboratory representative to find out which proposals were funded. Some people, undoubtedly, will be disappointed if their favorite proposal did not make the final cut. As mentioned above there were many considerations and reasons for dropping proposals from the list. If you are in this situation, and you feel strongly about your proposal, please work with your laboratory representative at EOARD. We can revise and reassess the proposal so it will be ready for the next time EOARD is asked to generate a load of contracts. If you have any insights, constructive criticisms, or suggestions to add, please send your comments to the Commander, Col John Pletcher, or the Chief of International Programs, Lt Col Don Erbschloe. EOARD will stand ready to coordinate funding of international science effectively and expeditiously.

New e-mail Addresses at EOARD

The Edison House has a new local-area-network and new servers. EOARD was the first office on-line and a benefit of the new hardware and software is a more direct e-mail address. You can contact anyone at EOARD via the old suffix "@onreur.navy.mil" or through the new suffix "@eoard.af.mil". The new address not only saves you three key strokes, but identifies us much better. The prefix is still the first letter of the first name and the entire last name of the person you wish to contact (e.g. Capt Pat Bradshaw is pbradshaw).

LIAISON OFFICER NEWS

This section is a forum for all liaison officers to address items of interest to the laboratories they represent. The reports on site visits, conference supports, Window-on-Science visits, and contracts are necessarily abbreviated. For full reports and more details, please contact your lab representative directly. Much of the information presented here is proactive. Pay particular attention to "WOS Opportunities". These are announcements of contacts with researchers under consideration for the Window-on-Science program but with whom we do not have a firm itinerary. This is your chance to contact the liaison officer and put in your request for the visitor to come to your group. Also look at the "Requests for Conference Support". Let us know if this is a conference your laboratory or EOARD should support. You can use this information to plan overseas TDYs; remember that we generally obtain a few free registrations and proceedings for the conferences we help fund.

Pay attention to the final three reports from Air Force personnel outside EOARD. We are anxious to hear about your visits to research sites or attendance at conferences in Europe. Please tell us about them so we can include your reports in future issues.

Capt Pat Bradshaw/ALB

Site Visit to the Experimentelle und Klinische Neuropsychologie Institut für Physiologische Psychologie, Lehrstuhl 11 Heinrich-Heine-Universität, Dusseldorf, Germany. Contact: Professor Eugene Wist, Department Chairman. Professor Wist has a very talented group of visual and vestibular researchers working on the following topics; angular acceleration in 3-D, vestibular evoked potentials, visual-vestibular interaction and visual psychophysics. The most interesting and unique piece of equipment is MARDER-- Multi-Axes Rotation Device for Experimental Research. This device is a hydraulically driven, servo-controlled multi-axes rotary chair. The device generates motion profiles with the subjects head in the center of rotation. This apparatus allows for motion stimuli which are below the vestibular threshold up to accelerations of 12 rad/s^2 (688 deg/s^2) and is used for vestibular, oculomotor and intersensory research in 3-D space.

Site Visit to the Abteilung Sinnes-und Neurophysiologie, at Dortmund University, Germany. Contact: Prof Carl Richard Cavonius, director. This Institute specializes in occupational physiology and has research departments in toxicology, sensory physiology and neurophysiology, environmental physiology and occupational medicine, ergonomics, and occupational psychology. The Institute has approximately 60 scientists, 60 technicians, and 60 students and researchers in training. The department of sensory physiology studies accomodation and convergence of the eyes to determine criteria for eyestrain. They are also studying the threshold levels at which fatigue onset occurs, an area of interest Dr Brian Tsou et al. and Dr Jon French et al. They also investigate the sensitivity of the eye for temporal and spatial instability, and the effects of chromatic and achromatic contrast to specify the characteristics of physiogically suitable displays. They study psychoacoustics to determine the effects of noise upon the perception of acoustic signals for information processing. The Institute has two very elaborate and sophisticated environmental chambers. The experimental area is 15 m^2. The range of air temperatures in the chambers is -35° C to +80° C, the relative humidity between 5 and 95%, and the wind between 0.2 m/s to 2.5 m/s. One chamber allows radiant temperature spread between -30° C and +180° C. Whole body vibrations in the vertical and horizontal direction allow the study of the effects of combined stress. The department of ergonomics has developed a system called

ERGON-EXPERT which very clos[illegible]mimics the COMBIMAN/CREW CHIEF system in th[illegible]AC Gateway publication. The Institute has many parallel interests with the Armstrong Laboratory. For more information please contact me.

Site visit to several Russian sites (Russian Institute of Aviation Medicine, Trecom, General Physics Institute, Institute of Chemical Physics, and the N.N. Andreyev Acoustic Institute Prof Nikolai Dubrovsky) Moscow, Russia. I was accompanied on this technical visit with Lt Col Mark Rogers and Mr Jack Lund (AL/OEOP). *The Institute of Aviation Medicine* is directed by Maj Gen G.P. Stupakov. They have many overlapping interests with AL/RIAM and I received a list of proposal topics they would be interested in collaborating with the Armstrong Laboratory. One of the most interesting discussions was on a drug the Institute tested and used for the last 20 years that allows individuals to survive extreme cold temperatures (-30° C) for extended periods of time. The developer of the drug served as his own control subject. He told me that he used the drug in a number of operational environments ie. arctic and antarctic expeditions and in ice water submersion. He functioned fairly normally with no loss of fine motor dexterity. This may be very useful in unpressurized flying environments and would be very interesting to test. The director of *the Trecom Simulation Company* is Andrey Buschgens. Trecom is connected to Central Aerohydrodynamics Institute (TsAGI) and handles all flight simulation for Russia. The facilities are not very sophisticated nor very elaborate. My contacts at *the Chemical Physics Institute* were Elena Borisovna Burlakova and Anatoly A. Popov. Professor Burlakova is the head of the department and is internationally known for her work on the chemical kinetics of cells. She claims to have a chemical cure for AIDS. This Insitute is now responsible for environmental issues in Moscow. There are over 500 scientists at the Institute.

The 9th International Conference on the Biochemistry of Exercise, Aberdeen, Scotland, 25-26 July, 1994. The topics covered were: nutritional influences on fatigue, exercise and bone metabolism, metabolism in muscle, regulation of carbohydrate metabolism in exercise, biochemistry of high intensity exercise, regulation of fat metabolism in exercise, triglyceride-fatty acid cycling in exercise, muscle adaptation to endurance training, exercise and the immune system, integration of fat and carbohydrate metabolism. This was cutting-edge research and directly applicable to Drs Loren Myhre, Ints Kaleps, Larry Krock, S. Constable, and Jon French. Please contact me for copies of the conference proceedings.

Upcoming TDYs: 4-8 Sept 94 European Neuroscience Meeting, Vienna, Austria.
21-24 Sept 94 Physiology and Pathophysiology of Exercise Tolerance, Ulm, Germany. (Tri-Service conference support with with ONREUR and ERO.)

Tri-Service conference support for the 5th International Meeting on Cholinesterases, Madras India, 24-28 Sep 94.

WOS Visit: Dr Sue Ward (St George's Medical School, London, UK) to visit Armstrong Lab. Dr Ward will be visiting Dr Larry Krock AL/CFTO (DSN 240-3521) in Sep 94

WOS Visit: Prof Freidrich Luft (Max-Delbruck Institute for Molecular Medicine, Berlin, Germany) to discuss hereditary brachydactyly at Armstrong Lab. Prof Luft will discuss a study he is proposing on the genetic basis for hypertension at Wilford Hall and UTHSC in San Antonio. His host will be Dr Loren Myhre AL/CFTO (DSN 240-3814).

WOS Visit: Dr James Tresilian (Cambridge University, UK) to discuss perception at Armstrong Lab. Dr Tresilian works at the Medical Research Center at Cambridge University. He will discuss his work and present a seminar on "Time to contact in perception and control of self motion" at the Armstrong Lab [illegible]-28 Sep 94. His host will be Dr Rik Warren AL/CFHP [illegible]5-8762).

WOS Visit: Prof R. Johansson (University of Umea, Sweden) to discuss sensory motor feedback at Armstrong Lab. Prof Johansson will present a seminar on his work on motor feedback at the Armstrong Lab from 26-28 Sep 94. His host will be Dr Rik Warren AL/CFBA ( )SN 785-3671).

Ms Janet C. Johnston/PLG

Site Visit to the National Institute of Rock Mechanics (Kolar), Indian Institute of Science (Bangalore), National Aeronautics Laboratory (Bangalore), National Geophysics Research Institute (Hyderabad), India. The NIRM in the Kolar gold fields is the site of the second deepest mines on Earth (3.2 km). My host was Dr C. S. Srinivashen who has recently finished a comprehensive report on the characteristics of mining-induced seismicity. The Kolar Gold Fields were first mined by the British 100 years ago. The Institute has a small, but diverse makeup with 28 scientists out of 65 employees. The special rock mechanics lab was established five years ago and must now obtain 50% of its funding from non-government sources. Support from mining enterprises is waning because deep mines are deemed uneconomical. The main objectives of the institute are to support mining and dam (usually hydroelectric) projects. Numerical calculations assist in major excavation design and ground control (supports) for safety, obtaining blasting efficiencies, and testing rock properties. The NIRM conducts a basic research program in rock failure using the gold mines for a laboratory. Because the gold mines are closing, they are transitioning to the nuclear waste storage problem for India's six nuclear power plants. They also are working on problems of roof collapse in the coal mines using the longwall technique. They claim the credit for turning industry mine design techniques from "rules of thumb" to scientific calculations. In 1978 a seismic lab was established in the Kolar Gold Fields to locate mining seismic events (rockbursts). They installed a 14 geophone vertical component-only array connected by cable to the lab. They claim a 30 meter location accuracy using a three dimensional velocity model developed in the lab. They record 20 to 30 major (amplitude > 100mm and duration > 30 seconds)

rockbursts per year at the mines. Their research has shown an increase in rockbursts with total tonnage removed, and their underground seismic lab computes numbers and locations of microseisms in real time to warn the miners of impending failures. A rise in frequency is also observed as a precursor to failure. All of these phenomena are studied by the scientists in this lab with some results pertaining to triggering of earthquakes by resevoir loading or fluid injection. There is also a rock and soil preparation lab, a hydraulic fracturing facility, and a quarry blasting research team that has their own laser profiler. The situation of this lab, in conjunction with working mines, and availability of extensive stress measurements, is ideal for examining the effect of different parameters on the inducement and nature of mining-induced seismic events.

Institute of Science: My host at the Indian Institute of Science was Prof C.R.L. Murthy, who is an associate professor in the Aerospace Department. The institute, through government funding, supports over 200 laboratories in India. Their campus facility in Bombay provides workspace for 8,000 scientists. The institute in Bangalore operates as an independent university with 42 departments and 2 faculties (science and engineering). The emphasis is on graduate research and military (including pilot) training. They do research in life and physical sciences, structures, aerodynamics, and propulsion. Entry into the department of aeronautics requires a basic degree in science. In Bangalore 2,000 to 2,500 students are doing masters or doctoral level research. Out of a multi-million dollar budget, half comes directly from government and half from contracts. Most of these are with defense contractors but faculty are allowed to do consultation using institute resources as long as the nature of the research corresponds to the institute's research areas of interest and maintains the objectives of the individual departments. The institute would be a good place to expand our Exchange Scientist and Engineer Program, since many of their researchers are military officers in a post doctoral associate program. Prof Murthy's area of interest is structural integrity investigation and fatigue fracturing. His group has collaborated with the NIRM for 15 years because of their program in acoustic emissions. They have experience with Russian MIG 21 and 29, SU 27, France's Mirage 2000, the UK's Jaguar and Russian helicopters. They work with Industan Aeronautics, Inc, in the development of LCA's (light combat aircraft) with 40% composite parts. The structures lab simulates loading on small parts. They use acoustic emissions for inflight monitoring of wings and engines. There is also work on debanding and corrosion problems on helicopter blades using an acoustic impact tester with an automated ping test device that can be dragged by hand over the surface. They have access to the wind tunnels of the Nation Aeronautical Lab that range in speeds from low to hypersonic.

National Aeronautics Laboratory: The NAL has divisions on two campuses: materials, structures, avionics, flight controls, aerospace electronics, propulsion, mathematical modeling, and aerospace optics. The 1,350 employees are divided into administrative staff, technicians and scientists. Three hundred scientists have PhDs. For the last three to five years they have focused on the development of an all-composite, two-seater aircraft. They have worked in conjunction with the Design Bureau of Russia (MDB). Restrictions on computer imports by the US forced them to develop their own parallel processor which they claim is comparable to Cray computers. They boast the largest acoustic test facility in Asia. Aging aircraft is a hot topic and the NAL has been talking to the US FAA about joint projects.

In the Structural Integrity Lab, Prof Parida, a former WOS participant, explained that they are using carbon fiber composites for aircraft wings. They are heavily involved with useful life testing on the MIG 21 because the Russians wish to extend the life of old aircraft rather than build new ones. As a side-line, the NAL is conducting a tectonic survey that involves comparing an old 19th century triangulation survey with current GPS receiver information. This project is a collaboration with JPL, Scripps Oceanographic Institute, and the University of Colorado.

National Geophysics Research Institute: The director of the NGRI is the Dr Harsh Gupta, a world-renowned geophysicist who specializes in reservoir-induced seismicity. Dr Gupta is running three seismic networks in India. Two are in the northeast which is one of the world's most [illegible] intercontinental deformation areas (12 magnitude 7.5 earthquakes in 55 years). Recently there was a large intraplate earthquake (6.3) in the southern-mid sub-continent in an unexpected location (Latur) and they are busy trying to understand this event. I was shown some beautiful 200 km long seismic refraction transects of areas in India that they are willing to let outside researchers use. I have many handouts from the published work of the scientists at the NGRI and more extensive notes on my visit. There are about 500 scientists on a campus that has many graduate students. The equipment is all modern and the buildings are new or in good condition. There is a large modern computer center. They have laboratories or departments of rock mechanics (many NIRM personnel were trained at NGRI), induced seismicity, ocean and coast surveyors, paleomagnetism, geochemistry and chronology, gravity, magnetics and cartography, deep seismic sounding, airborne measurements (magnetics and gravity), high pressure mineral physics, isotopes, global plate tectonic modeling, seismology, VLBI, and geotomography. Many visiting scientists come to the institute. I would highly recommend it as a site for a "Window-on Europe" visit from our laboratory scientists.

WOS Visits: Romanian scientists (Astronomical Institute of Romanian Academy of Sciences, Bucharest) to present seminars at Phillips Lab. Dr Geogetta Maris will present a seminar on coronal mass ejections and Mr Sorin Pajoda will discuss the prominence-solar interface during their visit Hanscom AFB from 19-30 Sep. Point of contact will be Dr Ed Cliver PL/GPSG (DSN 478-3975).

WOS Visits: Several European scientists to visit and work at PL/GPSS. Dr Bernard Fort (Observatoire de Paris) will present a seminar on Solar Physics to Conduct Observations during his

visit from 11-18 Sep. Dr Sami K Solanki (Institute of Astronomy, Swiss Federal Institute of Technology) will present a seminar on Solar Magnetism Studies Using Infrared Spectrapolarimetry during his visit from 17-26 Sep. Dr Jean Claude Jacques Vial (C.N.R.S Paris) will present a seminar on Solar Physics from Ground-Based Infrared and Space Observations during his visit from 11 Sep -13 Oct. Point of contact will be Dr Don Neidig PL/GPSS (DSN 867-7543).

WOS Visit: Prof Slavomir Gibowicz (Institute of Geophysics, Polish Academy of Science) to discuss characteristics of rockbursts at Phillips Lab. Prof Gibowicz will visit Hanscom AFB from 7-14 Sep. Point of contact will be Dr John Cipar PL/GPE (DSN 478 3767).

Ms Vicki Cox/BMD/PLP

Site Visit to Director Science BMD offices at the British Ministry of Defense, London. Discussions centered around joint UK/BMD projects and areas of mutual interest including the Scientific Cooperative Research (SCORE) and Space Technology Research Vehicle (STRV) programs. Potential for continued UK presence in the TOPAZ program was also discussed.

Site Visit to the Chemical and Biological Defence Establishment (CBDE) at Porton Down, Salisbury. Dr Graham Cambray and Dr Nick Robinson provided a tour of test facilities supporting BMD projects. Tests aimed at understanding, characterizing, and validating models of dispersion droplets resulting from a chemical weapon release at altitude were underway. A light gas gun facility dedicated to chemical and biological lethality studies for theater missile defense is being built on the site.

Site Visit to Defense Research Agency (DRA) Facilities in Ft Halstead and Farnborough. Accompanied Col Rich Davis, Phillips Laboratory Commander, Dr Yolanda King, PL/XPP Division Chief, and Mr Dave Founds, PL/XPI Division Chief, on a tour of two DRA facilities. At Farnborough, Francis Kiddle and Graham Davison provided an overview of Space Technology and Space Systems Divisions and Chris Morton covered the Weapons System Sector concentrating on Air and Strategic Systems. The visit to Farnborough provided an opportunity to meet with Vejay Thackur to discuss DRA joint interests with PL in sodium sulfide battery work being performed for PL by British Aerospace under an EOARD contract.

Site Visit to the University of Surrey and the Surrey Satellite Technology Limited (SSTL) facility at Guildford, Surrey. SSTL is wholly owned by (and collocated with) the University of Surrey, and all profits are fed back into the University's Center for Satellite Engineering Research. Prof Martin Sweeting, the director of SSTL, also works as a professor at the University. He provided an overview of the history and capabilities of SSTL. They are widely acknowledged as the world's leading supplier of microsatellites and the University is a center of excellence in satellite engineering research. One key technology that Surrey possesses is the control algorithm for gravity-gradiant stabilized satellites (presently one degree accuracy trying for 0.1 degree). Capt Jerry Sellers of AFIT is currently doing his PhD research in satellite propulsion at the University.

(Note: The co-author of this article was Lt Col Mike Markow.)

WOS Visit: Dr Maarten Meerman (SSTL at the University of Surrey, UK) to discuss SSTL's capabilities at the Space and Missile Center and PL. Dr Meerman will be in Los Angeles from 23-24 Aug 94. He will then travel to Phillips Laboratory on the 25th and 26th where he will meet with personnel of the Space Experiments Directorate. He will then attend the Small Satellites Conference at Utah State University from 29 August to 1 September.

WOS Visit: Dr Colin Webb (University of Oxford Department of Atomic and Laser Physics, UK) visits PL. Dr Webb visited Dr Bob Fugate of the Starfire Optical Range on the 2nd and 3rd of August. They held planning discussions for an upcoming conference (1996) on astronomical adaptive optics.

Conference Support for Dielectric and Related Phenomena, Czakopane, Poland, 12-16 Sep 94.

Dr Osama El Bayoumi/RLC

Bi-Service WOS Visit: Several European researchers to the ACS (The American Chemical Society) and OSA (The American Optical Society) National Meeting and Polymeric Thin Films for Photonic Application Symposium, Washington.

This joint EOARD and ONREUR activity brought nine European scientists to Washington DC to participate in the meeting held between 20-24 Aug 94. Besides regular conference presentations, the visiting European scientists participated in a special symposium on thin films for photonic applications and discussed their most recent work with DoD representatives. The points of contact are Dr Charles Lee, AFOSR, (202-76-4963) and Dr Geoffrey Lindsay The Department of the Navy, China Lake, (619-939-1630). The well-known WOS participants presented the papers listed below:

Prof Geoffrey J. Ashwell (Cranfield University, Center for Molecular Electronics, the Advanced Materials Group, Cranfield, UK). "Homomolecular Langmuir-Blodgett films for Second Harmonic Generation"

Dr L. Blinov (Institute of Crystallography, Russian Academy of Science, Moscow, Russia). "Stark Spectroscopy as a tool for the characterization of Nonlinear Optical Polymer"

Dr P. Günter (Institute of Quantum Electronics, Nonlinear Optics Laboratory, Zurich, Switzerland). "Polyimide Side Chain Polymers for Electro-Optical Applications"

Prof Andre Persoons (University of Leuven, Leuven, Belgium). "Experimental and Theoretical Investigations of the 2nd-Order NLO Properties in Visual Chromophores and Related Molecules"

Dr Siegfried Bauer (Heinrich Hertz Institut für Nachrichtentechnik, Materials Technology Department, Berlin,

Germany). "Pyroelectrical Investigations of Poled Nonlinear Optical Polymer"

Dr Zouheir Sekkat (Max-Planck-Institut für Polymerforschung. Mainz. Germany) "Room Temperature Photo-Induced Polar Order: A New Method for Poling Polymeric Films Containing Azo Dyes for Second Order Applications"

Prof W. Haase (Institut für Physikaliche Chemie Technische Hochschule. Darmstadt. Germany). "Poling Efficiency and Stability of Nonlinear Optical Polymers: A Comparison of Different Physical Methods"

Dr Joseph Zyss (France Teleco CNT/PAB Department D'Electronique Quantiqueet Moleculaire. Bagbeux. France). "Engineering Nonlinear Octupolar Systems: from Molecules to Oriented Materials"

Dr Jean-Michel Nunzi (Groupe Composants Organiques Service De Physique Electronique. Scalay Gif Sur Yvette. France). "Optical Poling of Polymers for Phase-Matched Frequency Doubling"

WOS Visit: Dr Franz Schreier (Institute of Optoelektronik, Oberpfaffenhofen, Germany) to discuss Fascode Line-by-Line Programs at PL/GP. Dr Schreier visit Phillips Laboratory at Hanscom AFB between 31 Aug and 2 Sept 94 to present a seminar and discuss his work on Line-by-Line Modeling and Analysis of high Resolution IR spectra at DLR. The point of contact at PL is Dr Steve Miller (617-377-2807).

WOS Opportunity for Dr Eugeny Korsunsky (Universität Graz, Institut fur Experimentalphysik, Graz, Austria). Dr Korsunsky, a Russian scientist on leave at the University of Graz, is expert in the field of laser cooling and manipulation of atoms and phenomenon of coherent population trapping. The WOS visit is scheduled to begin 15 Oct 94 and will include RL/ER, Harvard University, Cambridge MA, University of Stony Brook, NY, USAF Academy and University of Colorado at Boulder.

WOS Opportunity for Dr Yuri Rozhdestvensky (S. I. Vavilo State Optical Institute, St. Petersburg, Russia). Dr Rozhadestvensky is known for his research on the interface phenomena in quantum systems with the closed contour of interaction, as well as the velocity selection of atoms in different quantum states, sub-Doppler mechanisms of laser cooling of atoms, and coherent scattering of atoms by resonant standing waves. The WOS visit is scheduled to begin 15 Oct 94 and will include RL/ER and USAF Academy.

WOS Opportunity for Prof Michael Ashby (University of Cambridge, Department of Engineering, Cambridge, UK) and Dr Nadejda Kiselyova (A. A. Baikovinstitute of Metallurgy, Russian Academy of Science, Moscow, Russia). Prof Ashby and Dr Kiselyova will meet with USAF representatives and contractors at the Fall Meeting of the Materials Research Society in Boston MA between 27 Nov and 1 Dec 94. Prof Ashby will present an invited paper entitled "Material Innovation and Design". Dr Kiselyova will discuss her latest results on design of inorganic compounds for new electro-optical. ferro-electric. superconducting and semiconducting materials. She will also present an invited paper entitled "Principals of Computer Design of New Inorganic Compounds". The point of contact at Wright Laboratory is Dr Steven LeClair WL/MLIM (513-255-8787).

WOS Opportunity for Brig Gen Dr Magdi Hindawi (the Egyptian Air Force Research Center, Cairo, Egypt). Dr Hindawi will give several talks on Aerodynamics, Structures and Multinational High Performance Aircraft and the Adaptation of Different Munitions. The proposed WOS visit will include AFMC/ESC, AFMC/ASC, AFIT, and the USAF Academy.

Conference Support for the VIIth International conference on Physical Chemistry, 21-24 Sep 94, Bucharest, Romania. Topics to be discussed at this conference will include the most recent results concerning quantum chemistry: molecular structure and chemical bond, biological physical chemistry and the environment, photochemistry, radiochemistry, chemical thermodynamics and interface phenomena in colloidal systems.

Conference Support for the 3rd International Conference on Solar Energy and Applied Photochemistry 8-14 January, 1995, Cairo, Egypt. Topics to be discussed at this conference will include the most recent results concerning environmental photochemistry, photophysics and photochemical kinetics in condensed media, energy and electronic transfer in different molecular systems, photocatalysis and fuel production and solar energy storage and conversion in photosynthesis.

Request for Conference Support for Structural Materials: Engineering Application Through Scientific Insight Conference 25-26 April, 1995, London, UK. This meeting is to mark the 80th birthday of Donald McLean, an important and enduring influence on the science and engineering of materials for structural applications. The following topics will be covered: grain and phase boundaries, damage evolution, creep deformation and fracture and engineering applications.

Request for Conference Support for the 8th Laser Optics Conference (LO'95) and the 15th International Conference on Coherent and Nonlinear Optics (ICONO'95), 27 Jun - 1 Jul 95, St. Petersburg, Russia. ICONO'95 is the largest Russian Conference for the presentation of results of basic research on nonlinear and quantum optics, and on laser spectroscopy of atoms, molecules and condensed matter. All aspects and recent advances in laser physics, laser spectroscopy, nonlinear optics, quantum and X-ray optics, the effects of superintense fields, and precision optical measurements will be discussed at this meeting. LO'95 will provide a forum for the presentations on all aspects of lasers, quantum electronics and laser applications

Request for Conference Support for the 8th International Conference on the Physics of Non-crystalline Solids 28 Jun - 1 Jul 95, Turku, Finland. Topics to be discussed at this

conference will include the most recent results concerning near-field microscopies in the study of glass, photonics glass, new optical materials by wet chemical processing, redox equilibria in glass, silica in aqueous environments and glass transition phenomena: facts and theory.

Request for Conference Support for the 8th International Workshop on Glasses and Ceramics from 18-22 Sep 95, Faro, Portugal. The aim of this workshop is to bring together experimental and theoretical scientists from the fields of materials science, physics and chemistry, who are working on the fabrication, characterization and modeling of glasses and ceramics prepared by sol-gel route and it will emphasize the use of sol-gel for new materials and application in glass, optics, thin films, ceramics and composites.

Lt Col Michael Markow/RLE

Tri-Service Workshop Support for Optical Investigations of Semiconductor Surfaces, 14-17 Sep 94, Halle, Germany. This workshop will bring together the experts in East and West Europe to assess the state-of-the-art of non-destructive semiconductor characterization using advanced optical diagnostic tools.

Tri-Service WOS Visit: Prof Dr Eng Hans L. Hartnagel (Institut für Hochfrequenztechnik, Darmstadt, Germany) to discuss resonant tunnel devices. He will visit Wright Lab at Wright Patterson AFB on 28 Sep 94 and the Navy Research Lab (NRL) on 30 Sep 94. His host will be Dr Lutz Micheel WL/ELET (DSN 785-8642).

Tri-Service WOS Visit: Prof Lazslo Solymar (University of Oxford, UK) to discuss photorefractive materials and 3D holography. Prof Solymar will visit NRL in Washington DC on 11 Oct (Drs Feldman and Rabinovich, 202-767-2074), Rome Lab at Griffith AFB on 13 Oct (Dr Brost, RL/OCPA, 315-330-7669), and Rome Lab at Hanscom AFB on 17 Oct (Drs Alexander, Larkin, and Schott, RL/ERXE, 617-377-3733). Drs Ricklin and Vorontsov from the Battlefield Environment Directorate, US Army Research Laboratory in New Mexico, (505-678-1528), will meet with him at Griffith AFB on 13 Oct.

WOS Opportunities: Dr Marc Howyan (DGA/DRET, Paris, France), Dr Georges Fallion (Thompson CSF, Paris, France), and possibly one person from Centre De Etude de Gramet will discuss high power microwave (HPM) topics in the AFOSR/French HPM initiative. They will visit Phillips Lab at Kirtland AFB, Dr Agee, PL/WSR (DSN 246-2823) for two days during the week of 24 Oct 94.

WOS Opportunities: Dr John G. Gallagher and Dr Colin R. Brewitt-Taylor (Radar Division at Defense Research Agency, Malvern) will discuss electromagnetic analysis of various composite materials as novel Radar Absorbing Materials and Radar Cross Section prediction codes. Will visit Rome Lab, Dr Robert McGahan RL/ER (DSN 478-2526) on 24 Oct and Wright Lab, Mr Ken Helberg WL/AAWW (DSN 785-5579) on 26 Oct.

WOS Opportunity: Prof Hermann Uhlmann (Fachgebiet Theoretische and Experimentelle Elektrotechnik, Germany) will discuss modeling and simulation of cryoelectronic components along with superconducting applications of microwave devices. He will visit Rome Lab at Hanscom AFB, Dr Herd RL/ERAA (DSN 478-4214), tentatively on 24 Oct (Dr Ralston of Lincoln Lab will also attend) and possibly visit State University of New York at Stonybrook, NY, on 26 Oct.

WOS Opportunities: Prof Gianni Costabile (University of Salerno, Italy) and Dr Alexey Ustinov (Russian at KFA Juelich, Germany) will discuss different topics in superconductivity. They will visit Rome Lab at Hanscom AFB, Dr Stan Yukon RL/ERCP (DSN 478-5493), tentatively scheduled for the end of October 94.

WOS Opportunity. Dr Juergen Halbritter (Institute für Materialforschung, Karlsruhe, Germany) to discuss modeling of the surface impedance of high temperature superconductors. He will visit Rome Lab at Hanscom AFB, Dr Herd RL/ERAA (DSN 478-4214) tentatively scheduled for 7-25 Nov.

WOS Opportunities: Dr Alain Priou (Ministere de la Defense, DGA DRET, Paris, France) will discuss conformal antennae modeling and RCS topics in the AFOSR/French HPM initiative. He will visit Rome Lab in Hanscom AFB Dr Mailioux RL/ER, (DSN 478-3710) and possibly the Wright Lab in Nov.

WOS Opportunity: Prof Roberto Fornari (MASPCE-CNR Institute, Parma, Italy) will discuss thermal processing of InP. He will visit Rome Lab at Hanscom AFB, Dr Alexander RL/ERX (DSN 478-4034), near the end of the year or early next year.

WOS Opportunity: Geoarge Müller (Institut für Werkstoff Wissenschaffen, University Erlingen-Neürnberg, Erlingen, Germany) will discuss the preparation of low-defect semi-insulating InP-substrates to be used in integrated optoelectronic circuits. He will visit the Rome Lab at Hanscom AFB, Dr Alexander RL/ERX (DSN 478-4034), in July 95.

Bi-Service WOS Opportunity: Dr Peter Kirstein (University College London). Dr Kirstein is a renowned authority on computer world-wide connectivity, to include the DOD's implementation of the X.500 (contract with the USN) and Communications Architectures for Wide Area Carrier Services (grant with ARPA). He will visit Rome Lab at Griffith AFB, Mr Daniel McAuliffe RL/C3D (DSN 587-7667) and the Naval Telecommunications and Communications Service (NCTS) in Washington DC, Mr Bob Cooney (202-433-2448). Dates have not been established.

Request for Conference Support for the 8th Laser Optics Conference (LO'95), 27 June - 1 July 95, Saint Petersburg, Russia. All aspects and recent advances in laser physics, laser spectroscopy, nonlinear optics, quantum and X-ray optics, the

effects of superintense fields, and precision optical measurements will be discussed at this meeting.

Request for Conference Support for Mathematics of Neural Networks, 17-21 July 1995, Oxford, UK. This conference will focus on the contributions of various mathematical disciplines to neural networks. This conference is not intended to bring together the many applications of neural networks but to discuss how to better develop the neural network as a tool

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Dr Mark Maurice/WLA

Test and Evaluation International Forum, London, U.K. This conference was jointly sponsored by the ITEA, AIAA and RAeS as the first truly international conference on T&E, and attracted approximately 150 attendees. Papers were presented by the US, UK, France, Germany and Russia, with topics covering facilities, avionics, flight test, propulsion, and the acquisition process. Another conference of this type, also to be held in London, is being considered for June 1996, and would include the topic of T&E standardization.

In-Flight Simulation Workshop, London, UK. In conjunction with the T&E Forum, EOARD and USARDG jointly sponsored this workshop which was organized and chaired by Dr Wladimiro Calarese and Mr Don Gum of Wright Lab. Several overview papers of in-flight simulation capabilities were presented, including one from the Flight Research Institute in Russia. Overall, the workshop provided an excellent sampling of the current technology.

Seventh International Symposium on Applications of Laser Techniques to Fluid Mechanics Conference, Lisbon, Portugal. This bi-annual conference is becoming increasing recognized as the premier meeting in the subject area. This year there were more than 300 attendees representing 25 countries, and more than 40% of submitted abstracts were rejected. Along with advancements in conventional measurement systems such as LDV, PIV and PDA, new techniques were also presented, such as Rainbow Thermometry, which yields temperature measurements from the patterns of scattered laser light off flowfield seed particles.

Site Visit to Instituto Superior Technico, Experimental Fluid Mechanics and Combustion Laboratory, Lisbon, Portugal. This laboratory of 21 researchers is headed by Prof Manuel Heitor, who chairs the bi-annual Laser Techniques Conference. Primarily through European Community funding sources, this laboratory has acquired a wealth of laser-based measurement systems. Current research includes low emission combustor technology, turbulent transport processes in a variety of flames and jets, unsteady combustion, and fuel cells. A full listing of projects and publications is available on request.

Update on Thermo Combustion Database, The Technion, Israel: This database, which was made available by Prof Burcat following a site visit in Feb 94, can now be directly downloaded via FTP. Call FTP FTP.TECHNION.AC.IL with Userid PC/SUPPORTED/AETDD and Password ANONYMOUS.

WOS Visit: Dr Oded Yaniv (Tel Aviv University) to discuss *robust LTV feedback synthesis for non-linear plants*. Dr Yaniv will visit Wright Lab from 6-9 Sep 94. His host will be Capt Steve Rasmussen, WL/FIGS (DSN 785-2831).

WOS Visit: Prof Fred Stevens (University of Witwatersrand, South Africa) to discuss research development of the inverse Nyquist array controller design technique. Prof Stevens will be working with AFIT and Wright Lab from 11 Sep 94 - 14 Jan 95. At AFIT his host will be Prof Constantine Houpis and Dr Meir Patchter (DSN 785-3636). At the lab his host will be Capt Steven Rusmussen WL/FIGS (DSN 785-2831).

WOS Visit: Dr Claude Berner (ISL, France) to participate in a joint free-fly test in the Aeroballistic Research Facility. Dr Berner will be at Wright Lab from 15 Oct - 19 Nov 94. His host will be Mr Gregg Abate WL/MNAA (DSN 872-4085)

WOS Visit: Dr Nicolai Anfimov (Central Research Institute for Machine Building, Moscow, Russia) to discuss the Russian space program. Dr Anfimov will visit HQ Space and Missile Systems Center/XRI 9-16 Oct 94, hosted by Capt Bill Page (310) 336-4625. He will then be at AEDC 16-19 Oct 94, hosted by Mr Al Boudreau AEDC/XRI (DSN 340-6447).

WOS Visit: Dr Anatoly Nikulin (Institute of Inorganic Materials, Moscow, Russia) to discuss quench protection issues in superconducting magnets, high temperature superconductors, and power conductors. Dr Nikulin will be at Wright Lab 13-15 Oct. His host will be Dr Charles Oberly, WL/POOX-2, (DSN 785-4814).

WOS Opportunity for Dr Asher Sigal (The Technion, Israel): Topic will be a hybrid method for the analysis of multiple tail fins. Request by Mr Gregg Abate WL/MNAA (DSN 872-4085).

WOS Opportunity for Dr Alexander Zheltovodov (Institute of Theoretical and Applied Mechanics, Novosibirsk, Russia): Topic will be experimental work on high speed inlets. Request by Dr Joe Shang, WL/FI (DSN 255-6156).

Dr Norm Hecht/WLM

Site Visit to Spheric Engineering Ltd, Crawley, West Sussex, UK. Contacts: Julian R. Pratt, Chairman and Managing Director, Bob Hardisty, Technical Manager. Spheric Engineering is a leading manufacturer and supplier of high precision balls for engineering applications. Spherics standard ball products are machined and finished from tungsten carbide (WC) and silicon nitride (Si_3N_4) blanks. The market for Si_3N_4 bearings is still limited in spite of their higher wear resistance (about 30% longer life), and lower weight. A better understanding of how ceramic bearings perform based on

chemistry, processing, finishing protocol and applications conditions is needed.

Site Visit to Dept. of Materials and Processing, Research and Technology Unit, Ministry of Defense Hakirya, Tel Aviv, Israel. Contact: Dr Yidal Geffen - Head. The R&D Directorate (MAFAT) in the MOD serves as the interface between the military and R&D organizations (Rafael, Technion, Universities, IAI, IMI, AEC, etc.). The R&D Directorate has Science, Technology and QC Divisions. The Materials Department does not conduct R&D in-house but provides external funding. Major R&D projects involve ceramic armor, CMC and C-C development, advanced materials processing, and high temperature materials testing.

Site Visit to Materials Engineering Department, TAAS - Israel Industries Ltd., Ramat Hasharon, Tel Aviv. Contact: Dr Dov Chaiat - Department Manager. TAAS (formerly IMI) has redirected its R&D focus to support both military and industrial needs. Although the major emphasis is toward the development of armor and anti-armor systems this department is also involved in the development of materials for aircraft applications. The Department is conducting R&D projects for CMCs, MMCs, and refractory metal materials, development of layered tungsten composites, and explosive forming of powder tungsten alloys.

Site Visit to the Department of Materials and Interfaces, The Weizmann Institute of Science, Rehovat, Israel. Contacts: Prof Meir Lahov - Head, Prof David Cahen, Dr Gary Hodes, Prof Shimon Reich, Assoc Prof H. Daniel Wagner, Dr R. Tenne. The Department of Materials and Interfaces is conducting a number of materials R&D projects. The phenomena of ice nucleation and the role of dipole layers in surface cracks is being studied as a means for improving an understanding of the de-icing process. Morphological engineering techniques are being developed for single crystals that can be used for electro-optical applications. By selective crystal surface modification, a crystal with a center of symmetry can be modified to demonstrate piezoelectric properties. The surface morphology engineering can also be used to tailor other crystal properties and produce semiconductor materials at low temperatures. Chemical and electro-deposition processes are being used to prepare nanoparticle semiconductors (CdS, CdSe and PbSe). Nanosized semiconductors are being engineered for specific applications (IR detection, etc.). Superconducting composites are being developed based on the $YBa_2Cu_4O_8/YBa_2Cu_3O_7$ system. One composite, made by the densification of a mixture of superconducting phase $YBa_2Cu_4O_8$ and ferrite phase $YBa_2Cu_4O_7$, exhibits both superconducting and magnetic behavior. Fullerene-like structures of WS_2 and MoS_2 have been prepared with semiconductor properties

Site Visit to Israel Chemical Ltd. (ICL), Institute for R & D, Haifa Bay. Contacts: Dr Y. Yesherun, Dr Rimma Khodakovskaya, Dr Roey Shaviv. ICL, Israel's largest chemical company has initiated a number of innovative advanced ceramic materials projects in the production of high quality monolithic SiC, Si_3N_4 and TiN-TC ceramics, SiC and TiN whiskers, Al_2O_3 and TiB_2 platelets of controlled morphology and aspect ratios for ceramic matrix reinforcement, and continuous ceramic fibers tapes and honeycomb tapes 50-100μm in diameter. In the green state the fibers behave like high strength cotton thread

Site Visit to the Technion Research and Development Foundation Ltd., Haifa, Technion City, Israel. Contacts: *Dept of Materials Engineering:* Dr Yigal Komem - Head, Mr Noah Shafry, Dr Dov Sherman, Dr E. Zolotoyabko, Dr Rachman Chaim, *Israel Institute of Metals:* Dr Joseph Zahavi, Dr Remanuel Arone, Dr L. Gal-Or, *Israel Ceramic and Silicate Institute:* Dr R. Fischer Director. A majority of Technion projects are focused on the development of advanced processing methods. Studies include the growth kinetics of single crystal Al_2O_3 in polycrystalline Al_2O_3, the mechanical behavior of Al_2O_3 plates layered between fiber-reinforced polymer composites, measurement of bond strength of fiber reinforced CMC's, electrophoretic and electrolytic deposition processes, sol-gel processes, laser surface processing and laser assisted CVD processes, and the modeling of mechanical failures and spatial uncertainties of composite systems.

Site Visit to Rafael, MOD, Haifa, Israel. Contacts: Dr Nahum Nir - Deputy Director for Engineering Materials and Processes, Dr Zvi Rosenberg - Ballistics Center, Dr I. Lubezky - Head Optical Coatings Laboratory, Dr Igal E. Klein - Manager Special Technologies Section. The primary mission at Rafael is armament development. A composite system comprised of a porous (20-30%) B_4C preform vacuum infiltrated with Al is 40% lighter and has 3x higher fracture toughness compared to Al_2O_3. The system is being designed for helicopter armor and has a 2-3 multi-hit capacity

Site Visit to the Hebrew University of Jerusalem, Jerusalem, Israel. Contacts: Prof Itzhak Roman, Prof Gad Marom, Prof Renata Reisfeld. Hebrew University has a diversity of ongoing materials research projects including rapidly solidified 8% Fe/Al with small additions of metal alloys (V, Cr, etc.) and reinforced with SiC platelets, acoustic emission tests on alloying agents and composites, measurements of tension, flexure and fracture toughness, ballistic impact resistance tests on polymer matrix composites, and the development of glasses and gels for electromagnetic applications. Both doped glasses and dye- infiltrated gels are being developed for waveguides, non-linear optics, sensors, etc. Thin films made by sol-gel processes with chemical additives that react optically when in the presence of hazardous elements (PPB) are being developed for use as sensors. Rare earth dopants of gel systems are being developed as optical amplifiers in laser systems.

Site Visit to IAI (Israel Aircraft Industry), TASHAN Engineering Center, Ben Gurion Airport. Contacts: Dr B. Cina - Senior Metallurgical Consultant, Dr Hans Rosenthal - Senior Scientist (Composites). IAI is Israel's largest company. It is government-owned and has four divisions. The Engineering Center TASHAN, part of the Aircraft Division has four sections. The physics section is involved in nondestructive testing, electrical measurements, and microwave applications.. The chemistry section is involved in coatings, surface treatments, and chemical laboratory services. The non-metallics section is

developing fractography methods for carbon fiber reinforced polymer matrix composites, a resin transfer molding process, and an advanced polymer repair process. The metallurgy section is investigating of Al-Li alloys (mechanics of brittle failure) and rapid solidified Al alloys, MMC's with particle reinforcement, and novel methods for increasing ductile behavior of ceramics at high temperature.

The 8th Cimtec World Ceramic Congress, Florence, Italy, July 94. The Congress consisted of a general session, four special symposia (Ceramics in Architecture, the Ceramics Heritage, Classical Ceramics and Advanced Technical Ceramics) and eight topical symposia (Inorganic Films and Coatings, Diamond and Diamond-like Films, Inorganic Structural Fiber Composites, Superconductors, Materials in Engines, Intelligent Materials and Systems, Optical and Opto-electronic Materials and Materials in Clinical Applications). Over 1400 papers were presented. The proceedings will be published in the spring of 1995.

WOS Visit: Dr Gerd Lütjering (Technical University of Hamburg, Germany) to discuss Ti alloys at WL. Dr Lütjering will discuss his work at the Wright Lab on 2 Sep 94. His host is Dr James M. Larsen WL/MLLN (513-255-1357).

Maj Dan Stech/WLS

WOS Opportunity for Professor Allan Matthews (University of Hull, Hull, UK): Topic will be current state of the art of thin film deposition for tribological coatings development in Europe. Request by Dr Michael Donley WL/MLBT (DSN 785-6485)

Tri-Service Conference Support: Second International Conference on Smart Structures and Materials, 12-14 October, Glasgow, Scotland. The conference will emphasize applications in the civil engineering, aerospace, and manufacturing fields. Enabling technologies such as: piezoceramics, piezopolymers, electro & magneto-restrictive materials, shape memory materials, fiber optic sensors, biomimetics and signal processing for fault diagnosis and control will be covered. The conference is being organized by Dr Alaster McDonach, Smart Structures Research Institute, University of Strathclyde. This conference is being sponsored jointly by EOARD, ERO, and ONREUR. A few free registrations and proceedings are available through EOARD.

Lt Col Don Erbschloe/CI

The Third Atlantic Test Workshop, Nîmes, France, 30 June-1 July. This was the European portion of a two-part, international, multidisciplinary workshop. (The American portion was held in Lowell, Massachussetts in early June.) The site was the Ecole pour les Etudes et la Recherche (EERIE) in Nîmes. This is an ultramodern facility for the education of electrical and computer engineers. The school currently houses approximately 240 undergraduates, a handful of graduate students, and has facilities for short-courses for French industries. A small, enthusiastic gathering of 35 researchers in microelectronics, circuitry, and computer science presented sixteen papers and held two panel discussions on a variety of topics in education and industrial experience in international collaborative efforts, fault modeling and simulation for microcircuits, and the use of new computer codes and languages for testing and diagnosis of mircrocircuits. The most important aspect of this annual workshop is "the international spirit of the steering committee in their "search for the best formula for cooperation among academia, government, and industry" from both sides of the Atlantic. This is best exemplified by a consortium called MicroLabs International composed of representatives from the Universities of New Hampshire and West Virginia, EERIE, and the Technical University of Budapest in Hungary. This consortium does ground-breaking research on a fully-international scale in a wide variety of projects for education, industry, and government. For example, they are working with the Polish-American Environmental Defense Initiative, the USAF mobile command and control system, data system modernization for the Air Force, and meteorological data systems for the Army. The consortium is evolving and growing and is a terrific role model for international research efforts.

WOS Visit: Prof Iouri Ananiev (St Petersburg State Technical University, Russia) and Dr M.U. Zagidullin (P.N. Lebedev Physical Institute, Russia) to discuss chemical oxygen iodine laser issues with representatives from Phillips Lab. These two eminent Russian researchers are being sponsored by EOARD to attend the 1994 Gas Chemical Laser conference at Friederichshafen, Germany from 5-8 Sep. They will meet with and discuss their work on COIL systems with Dr Harro Ackerman and other researchers from PL/XP.

Change in ESEP personnel: The last issue of the *EUROGRAM* listed the seven participants selected for the Engineer and Scientist Exchange Program. One of them, Ms Cindy Schurr, was recently selected for a Sloan Fellowship. Because of this prestigious honor, Ms Schurr will not be going to her ESEP slot at Manching, Germany. We wish her well in her new program and we are considering options to fill the vacancy.

Announcement of VKI scholarship recipients: The US Air Force has awarded two scholarships for students attending the one-year diploma course at the von Karmann Institute in Belgium. The recipients are David Banks, currently a research assistant in the aeronautical engineering department at UC Davis, and Rolf Strutzenberg, an engineer with ISHIDA Aerospace Research, Inc, in Dallas, Texas.

Lt Col William W. Humphreys
AFMC/ODC Paris, France

***Journee Thematique* on Unsteady, Turbulent Aerodynamics, Paris, France, 30 June 1994.** This "theme day" was a French equivalent of AFOSR-sponsored contractor workshops. The meeting was attended by approximately 75 French researchers

representing a cross section of government research offices (such as DRET and ONERA), defense contractors (such as Dassault Aviation), and university researchers. DRET selected six presentations on numerical computations which addressed small-scale models, high precision methods for compressible flow, large eddy simulation, pulsed channels, and turbulent mixing layers. Following these papers were presentations on experimental aspects including light scattering techniques, other quantitative optical methods, backward-facing steps, shock-turbulence interaction, pulsed-channel flows, and pressure measurement by laser-induced fluorescence. DRET and AFOSR have extended invitations to US counterparts to attend these theme days or contractor workshops. Although the meetings are conducted in French, DRET would like to initiate some US-French discipline-oriented workshops that would be in English.
(Note: for more information, contact Lt Col Humphreys at 33-1-4296-1202 x 2683 or via e-mail whumphreys@onreur.navy.mil.)

Ms Catherine Vogel
AL/EQW Tyndall AFB, FL

NATO Advanced Research Workshop: "Identification and Selection of Technologies for Site Remediation at Former Soviet Military Installations in Central and Eastern Europe". The NATO ARW was held in Visegrad, Hungary. It was funded by the International Scientific Exchange Programme of NATO. The participants included experts from NATO as well as eastern European participating countries. The purpose of the workshop was to develop a strategy for selecting technologies and evaluating remediation approaches for contamination sites on former Soviet military installations in central and eastern Europe. The strategy considered the economic and financial conditions of the region, the urgency for which the sites need remedial action, the prioritization of resource allocations for site cleanup, and other crucial issues. The workshop included a site visit to an abandoned Soviet military installation in Komarom, Hungary (located in northern Hungary). The Soviets stored munitions and explosives at this facility from 1945 to 1990. The Hungarian government has documented extensive POL contamination. I gave a presentation on bioventing technology and received many requests for copies of the Air Force Bioventing Protocol and other published material on this technology. The workshop proceedings will be published in the NATO ASI Series. The US EPA Risk Reduction Engineering Laboratory has funding to demonstrate bioventing in an eastern European country. Representatives from the Hungarian government are very interested in offering a site in their country on this project.
(Note: If you would like more information on this workshop, please contact Ms Vogel AL/EQW-OL at DSN 523-6208.)

Capt Jerry Sellers, AFIT
University of Surrey, UK

2nd Annual International Symposium on Small Satellite Systems and Services, Biarritz, France, 27 June - 1 July 1994. As the aerospace community rushes to embrace the new philosophy of "faster, better, cheaper", the role of small satellites (under 250 kg) is beginning to be taken much more seriously. Major players in the community both in government (NASA, CNES, ESA) and in the private sector (Lockheed, Alcatel, TRW) are turning their attention to small satellite builders (UoSAT, TubSAT, SunSAT) to see what they can learn. This symposium included delegates from most European countries, as well as Brazil, Argentina, Russia, Israel, South Africa, and the US. In particular the following individuals and organizations are of interest to the US Air Force:

- Prof Dr Udo Renner, Technical University of Berlin, for small, low cost ADCS
- Mr Allen Maclaren, Lockheed Missiles and Space, Inc., for small satellite launch vehicles
- Mr Dave Beardon or Mr Robert Abramson, Aerospace Corporation, for small satellite cost models
- Dr Yury Solomonov, Complex (Russia), for START launch vehicle
- Dr Gennady Malyshev, Moscow Aviation Institute, for ion propulsion, tethered satellites, and launch vehicles
- Mr Stephen Johnson, NASA, University of Cincinnati, Space Engineering Center, for fault tolerance design

A bullet background paper on this symposium as well as a list of participants (a who's who in small satellites) are available from me or through EOARD.
(Note: for more information contact Capt Sellers at 44-483-300800 x 3411 or via e-mail eep1js@ee.surrey.ac.uk)

POINTS OF CONTACT

The following is a list of personnel currently assigned to EOARD, their office symbols, phone numbers, and e-mail address. To phone someone on this list, use the overseas DSN prefix (235) or the commercial prefix (44-71-514).

NAME	DUTY ASSIGNMENT	PHONE/OFFICE SYMBOL	E-MAIL
Col John Pletcher	Commander	4376/CC	JPletcher@eoard.af.mil
Lt Col Don Erbschloe	International Programs/Physics	4505/CI	DErbschloe@eoard.af.mil
Lt Col Mike Markow	Electrical and Computer Engineering	4526/RLE	MMarkow@eoard.af.mil
Maj Dan Stech	Aerospace Structures	4318/WLS	DStech@eoard.af.mil
Capt Pat Bradshaw	Life Science	4285/ALB	PBradshaw@eoard.af.mil
Ms Vicki Cox	Physics and Ballistic Missile Defense	4437/PLP/BMD	VCox@eoard.af.mil
Dr Osama El Bayoumi	Chemistry and Geophysics	4384/RLC	OElbayoumi@eoard.af.mil
Dr Mark Maurice	Aeronautical Sciences	4299/WLA	MMaurice@eoard.af.mil
Ms Janet Johnston	Geophysics and Space Science	4474/PLG	JJohnston@eoard.af.mil

Joint Points of Contact

EOARD shares its London office, the Edison House, with other agencies from the US Army, Navy, and Air Force. For information about the functions and activities of thes agencies use the points of contact listed below. To phone someone on this list, use the overseas DSN prefix (235) or the commercial prefix (44-71-514). The e-mail suffix is @onreur.navy.mil.

Agency	Points of Contact	Phone Extension	e-mail prefix
US Army Research and Development Standardization Group (USARDSG)	Col Hank Atwood (Commander)	4911	hatwood
	Lt Col Bob Medler (Standardization Division Chief)	4657	rmedler
European Research Office (ERO), Army	Dr Karl Steinbach, Director	4907	ksteinbach
Office of Naval Research, Europe (ONREUR)	CDR Dale Milton, Commander	4417	dmilton
	Dr John Silva, Scientific Director	4508	jsilva
Research and Development Liaison Office (RDLL), Air Force	Lt Col Brian Sumner, Director	4956	bsumner
	Mr Craig Gran Pre, Deputy	4668	cgrandpre

RESEARCH CONTRACTS

Technical liaison initiated by a Window-on-Science or a visit at a conference may result in a research proposal. Proposals submitted to EOARD are screened and then forwarded to the appropriate Air Force Agency for evaluation and consideration for funding. Listed below are recent proposals which have been awarded contracts. They represent a sampling of the scientific work being done in Europe. **Bi-service and tri-service contract and grant efforts are in bold print.**

Title	Principal Investigator	Country	US Sponsor
1. Optical frequency standard (3.3 micron) based on diode-pumped solid state laser with methane absorption cell	Dr Mikhail A. Gubin	Russia	PL/LIDA
2. Seismic monitoring with small aperture arrays under strong noise conditions: algorithms, techniques, system design, and experimental data processing	Dr Alex Kushnir	Russia	EOARD, PL/GPE
3. Development of a simple near infrared spectrometer for space use	Dr Simon B. Calcutt	UK	EOARD
4. Provision of samples of new perflouropolyethers as potentially novel lubricants	Prof R. D. Chambers	UK	WL/MLBT
5. Feasibility studies on European databases	Dr Louis Lee	UK	**EOARD, USARDSG**

CONFERENCE SUPPORT

EOARD promotes technical interchange by supporting and co-sponsoring (with other governmental agencies) technical workshops and mini-symposia at overseas conferences. We often receive free proceedings and attendance for one or more Air Force representatives. Air Force R&D personnel attending or considering to attend European conferences should contact EOARD for information and to determine whether free registration is available. We have also listed conferences being supported by our sister-service London offices, ERO and ONREUR. **Bi-service and tri-service support efforts are in bold print.**

Dates	*Location*	*Conference/Workshop Title*	*LO Contact*
30 Aug-3 Sep	Florence, Italy	2nd European Bioinorganic Chemistry Conference	RLC
4-8 Sep	Eindhoven, Netherlands	1994 European Conference on Visual Perception	ALB
4-9 Sep	France	Applications of Organometallic Chemistry in the Preparation and Processing of Advanced Materials	ONREUR
7-9 Sep	Lublin, Poland	Electromagnetic Devices and Processes in Environment Protection	**ERO,ONREUR**
7-9 Sep	Irsee, Germany	Mullite and Mullite Ceramics	WLM
10-11 Sep	Russia	Russian-American Workshop on Combustion	ERO
11-15 Sep	Birmingham, UK	Rare-earth Magnets and their Applications Workshop and Symposium	WLM
12-16 Sep	Czakopane, Poland	Dielectric and Related Phenomena	PLP
12-17 Sep	Russia	International Conference on Combustion	ERO
13-15 Sep	Southampton, UK	5th International Conference on Computer Aided Design, Manufacture, and Operation in the Marine and Offshore Industries	ONREUR
14-17 Sep	Halle, Germany	Optical Investigation of Semiconductor Surfaces	**RLE, ONREUR**
15-16 Sep	Southampton, UK	4th Workshop on Ice Technology	ONREUR
19-23 Sep	Oxford, UK	European Conference on Laser Interaction with Matter	**CI, ONREUR, ERO**
19-25 Sep	Giens, France	Recent Advances and Future Needs in the Microscopy of Materials	WLM
20-23 Sep	Spain	4th International Workshop on Non-crystalline Solids	ONREUR
21-24 Sep	Bucharest, Romania	7th Conference on Physical Chemistry	RLC
24-28 Sep	Madras, India	International Meeting on Cholinesterases	**ALB, ERO, ONREUR**
25-28 Sep	Texel, Netherlands	3rd International Conference: Gas in Marine Sediments	**ALB/PLG/RLC ONREUR**
26-30 Sep	Poland	Computer Science Logic	ONREUR
26-30 Sep	Jaca, Spain	Intenational Workshop on Total Positivity and its Applications	CI/PLP
27-30 Sep	Austria	6th European ISTVS Conference	ERO
27-30 Sep	Cambridge, UK	The Human-Electronic Crew: Can You Trust Them?	WLA
1-8 Oct	France	2nd International Workshop on Microscopic and Macroscopic Approaches to Detonation	**ERO,ONREUR**
2-7 Oct	Irsee, Germany	Gordon Research Conference on Modern Developments in Thermodynamics	ONREUR
4-7 Oct	Glascow, Scotland, UK	5th European Symposium on Reliability of Electron Devices Failure Physics and Analysis	**BMD/PLP, ONREUR**
8-13 Oct	Capri, Italy	Nonlinear Superconducting Devices and High Tc Materials	CI/PLP
11-14 Oct	Glascow, UK	Tenth Optical Fibre Sensors	ONREUR
12-14 Oct	Glascow, UK	Second European Conference on Smart Structures and Materials	**WLS, ERO, ONREUR**
8-14 Jan 95	Cairo, Egypt	3rd International Conference on Solar Energy and Applied Photochemistry	RLC

WINDOW ON SCIENCE

Perhaps the most effective means EOARD has to initiate and promote technical liaison between Air Force and European scientists is the Window on Science (WOS) program. Through this program we can arrange and fund the visits of European scientists to selected Air Force facilities. To nominate a WOS candidate contact your laboratory Chief Scientist and/or your EOARD Liaison Officer. Below is a list of some WOS visits planned for the upcoming months. For further details regarding a visitor read the expanded details in the Liaison Officer section of the *EUROGRAM* or contact the LO the point of contact at the visit site, or the EOARD Chief of International Programs. **Bi-service and tri-service coordinated visits are in bold print.**

Dates	*LO*	*Traveler*	*Country*	*Topic*	*Location(s) of US Visit*
18 Jul - 13 Oct	WLS	Dr Wesley J. Cantwell	UK	Long term fracture characterizations of polycarbonate resin for aeronautical applications	WL/FIV
1 Sep	RLC	Dr Franz Schreier	Germany	Fascode line-by-line programs	PL/GP
2 Sep	WLM	Prof Gerd Lütjering	Germany	Ti Alloys	WL/MLLN
2-6 Sep	WLS	Dr Otto Sensburg	Germany	Separated unsteady flows, tail buffet and related active controls programs	WL/FI
5-8 Sep	CI	Prof Iouri Ananiev, Dr M.U. Zagidullin	Russia**	Chemical oxygen iodine lasers	Meet with PL reps at GCL '94 Conference, Friedrichshafen, Germany
6-9 Sep	WLA	Dr Oned Yaniv	Israel	Robust LTV feedback synthesis for non-linear plants	WL/FIGS
7-14 Sep	PLG	Prof Slavomir Gibowicz	Poland**	Characteristics of rockbursts	PL/GPE, AF Seismic Research Symposium
10-15 Sep	RLC	Dr Paolo Colombo	Italy	Preparation of thin silicon oxycarbide and silicon carbide films	Penn State, AFOSR
11-18 Sep	PLG	Dr Bernard P.R. Fort Dr Jean Claude Jaques Vial	France France	Solar physics from ground-based infrared and space observations	PL/GPSS
12 Sep - 13 Jan	WLA	Dr A. L. Stevens	UK	Quantitative feedback theory	AFIT/ENG, WL/FIGS
17-26 Sep	PLG	Dr Sami K. Solanki	Switzerland	Solar magnetism studied under infrared spectrapolarimetry	PL/GPSS
17-30 Sep	PLG	Dr Iraida S. Kim	Russia**	Solar prominence observations	PL/GPSS
26-28 Sep	ALB	Dr James Robert Tresilian	UK	Perception and control of self motion	AL/CFHP
26 Sep-28 Oct	PLP	Prof Petr G. Eliseev	Russia**	Semiconductor lasers	PL, LLNL
4-6 Oct	ALB	Dr Friedrich C. Luft	Germany	Hereditary brachydactyly associated with hypertension	Brooks AFB
9-16 Oct	WLA	Prof Nicolai Anfimov	Russia**	Russian space program	SMC/XRI, AEDC/XRI
10-12 Oct	WLM	Dr Anthony Roland Bunsell	UK	A review of the state of the art for ceramic fibers	WL/MLLM
13-15 Oct	WLA	Dr Anatoly D. Nikulin	Russia**	High temperature superconductors for a/c applications and thin ceramic dielectric insulators, and High purity Al and Be and their composites for power conductors	WL/POOX-2
11-17 Oct	RLC	Prof Laszlo Solymar	UK	Three dimensional holography in photorefractive materials	**NRL, RL**
12-29 Oct	RLE	Prof Nickolai G. Basov	Russia**	A new approach to energetics: the hybrid laser power station with laser thermonuclear initiation	WL/ML, AFIT, PL, USAFA, Univ Fla, ESC, RL, Lincoln Lab

** Indicates visits EOARD has coordinated that do not strictly fall under the WOS program.

EOARD would like to hear your feedback and answer your questions. Please write or call your liaison officer or, if you have specific comments about the *EUROGRAM*, contact the editor, Lt Col Don Erbschloe (EOARD/CI):

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